

**MARKET ENHANCEMENT OPPORTUNITIES FOR
WATER-EFFICIENT PRODUCTS**

STAKEHOLDER MEETING

Urban Landscape Irrigation Products

**Wyndham Phoenix
Phoenix, Arizona**

February 17, 2004

Meeting Summary

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1. INTRODUCTION

The United States today faces both water infrastructure and water supply problems. If investment in water and wastewater infrastructure does not increase, the funding gap between water needs and investments over the next 20 years could grow to as much as \$224 billion. Just as important, 36 states expect to experience water shortages over the next 10 years, even without drought conditions.

To address this critical issue, the U.S. Environmental Protection Agency (EPA) is planning a national program to promote water-efficient products to consumers. One of the tools under consideration is a water-efficient product labeling program based on EPA's highly successful ENERGY STAR® program, a government-backed program to protect the environment through superior energy efficiency. As a first step toward assessing the needs of a water-efficient product labeling program, the Agency is conducting a series of stakeholder meetings to work toward possible approaches and partnership opportunities to promote water-efficient products. The February 17, 2004 meeting in Phoenix, Arizona, was the third of the stakeholder meetings. The first stakeholder meeting was conducted in Washington, DC, on October 9, 2003, and the second meeting was conducted in Austin, Texas, on January 15, 2004.

This report summarizes the presentation and facilitated discussions that occurred at the February 17, 2004 meeting. Copies of background information, press releases, speeches, presentations, brief biographies of the panelists, and a list of the attendees can be found on EPA's water-efficiency Web site at <<http://www.epa.gov/owm/water-efficiency/index.htm>>.

2. OPENING REMARKS

Welcome:

Karen Smith, Arizona Department of Environmental Quality

Karen Smith, Water Quality Division Director for the Arizona Department of Environmental Quality (ADEQ), welcomed everyone to the meeting and to the state of Arizona. Dr. Smith noted that Arizona only receives about seven inches of rain a year, is heavily dependant on canals for its aquatic needs, and the state's water supply is in danger. A mere 36 percent of what the state normally receives from mountain runoff is in its reservoirs and many lakes are only at 30 percent capacity. As one can see, water conservation is imperative to the future of water in Arizona. To help increase future supplies, Dr. Smith indicated that Arizona has been adopting beneficial water conservation efforts to combat the excessively low levels of water in their reservoirs and lakes.

Dr. Smith discussed some of the issues associated with water reclamation in Arizona. Specifically, Dr. Smith contends that the regulations listed in the Water Rights Law and Doctrine of Prior Appropriation and Western Water Rights make it difficult to actually conserve water as someone is always next in line to receive the water saved by someone else. Although Arizona is

making some progress in water conservation, Dr. Smith welcomes EPA's assistance in further developing ADEQ's water conservation efforts.

Welcome:

Jim Hanlon, Director, Office of Wastewater Management, EPA

Jim Hanlon, Director, EPA's Office of Wastewater Management, welcomed everyone to the third stakeholder meeting to explore labeling and other market enhancement options for water-efficient landscape irrigation products. He stated it was good to see such a large, diverse crowd interested in landscape irrigation.

Mr. Hanlon noted that the water-efficient product labeling program, or Water Star for short, is one of the actions EPA is taking to enhance efforts to promote water efficiency. Other actions include managing water demands, preventing water losses, reducing wastewater flows, and reusing treated wastewater. Previous actions taken by the Agency include issuing a policy to make it easier for apartments and other multi-unit buildings to submeter and individually bill their tenants, thereby sending a price signal to encourage conservation. EPA has also clarified its State Revolving Fund loan eligibility for water-efficiency measures, and continues to publish manuals, reports, and other documents on the subject. Mr. Hanlon indicated that EPA plans to issue a major update of the Guidelines for Water Reuse in the near future.

Mr. Hanlon believes that implementing Water Star will increase water efficiency by:

- Helping consumers identify and understand the numerous advantages of water-efficient products for residential or commercial use.
- Motivating manufacturers to produce more competitive water-efficient products.
- Encouraging and helping distributors, retailers, water and wastewater utilities, and local and state governments to promote these products.

Mr. Hanlon further emphasized that Water Star would be voluntary and work on a partnership basis with the various stakeholders.

Although many different types of products will be evaluated by the Agency, Mr. Hanlon reiterated that the focus of this meeting is landscape irrigation products. Based on its research, the Irrigation Association (IA) believes there is strong potential to save significant amounts of water through market enhancement activities for water-efficient landscape irrigation products. Mr. Hanlon added that although EPA has a keen interest in product labeling, other opportunities are being investigated, (e.g., voluntary standards, sector-based outreach, and design competitions). EPA also wants to be sure its efforts will clearly increase benefits from activities already under way, such as the ENERGY STAR program and national plumbing product and appliance standards. Water Star is in the beginning stages and a lot of research remains to be

completed. Mr. Hanlon stated that EPA is currently working on the following Water Star activities:

- Procuring consultant services to provide support for the program. Before any decisions are made on key aspects of the program, EPA will seek stakeholder input.
- Hiring additional full-time staff for the project.
- Conducting one additional meeting and then assessing the need for future meetings and other mechanisms for stakeholder involvement. The next meeting will be in Seattle, Washington on April 13 and 14, 2004 to discuss residential, commercial, and institutional products for indoor use.

Mr. Hanlon then reflected back on the past two meetings. He stated that, in general, most stakeholder groups were supportive of an EPA labeling program for water-efficient products. Some notable comments include:

- The program should be voluntary and national.
- Product performance and sustainability are key factors.
- Performance metrics should be developed early.
- Avoid confusing the marketplace or placing unreasonable demands on manufacturers or retailers.
- Purchasers, retailers, suppliers, manufacturers, utilities, and stakeholders in general, need more education about water-efficient products.
- More water-efficient technology research and development is needed.
- Develop complementary strategies as part of a comprehensive effort to promote water efficiency.
- Base the program name and logo on professional market research.

During EPA's first stakeholder meeting, two presentations were made by representatives from the irrigation industry. Tom Kimmell from IA provided an overview of activities focusing on water-efficient landscape irrigation products. Ron Wolfarth of the Rain Bird Corporation cautioned that new controller and sensor technologies are part of a system, which must be designed, installed, and managed as such to achieve efficiency savings. If the management and expertise issue is not addressed, Mr. Wolfarth maintained that Water Star irrigation products may simply waste water more efficiently.

Mr. Hanlon stated that today's panelists represent a broad range of perspectives and experience to help in the discussions and to teach participants about water-efficient landscape irrigation products and their potential in the marketplace. Mr. Hanlon believes that the input EPA receives here, and in subsequent stakeholder meetings, will be invaluable as the program is formed. He concluded by stating that EPA cannot succeed without the help of all stakeholders so the Agency will continue to build the program together with all interested parties.

3. PANEL DISCUSSION: WHAT IS THE PROMISE OF NEW LANDSCAPE IRRIGATION TECHNOLOGIES FOR ENHANCING WATER EFFICIENCY?

The first panel of the day discussed the promises of new landscape irrigation technologies for enhancing water efficiency and consisted of four panelists representing the Irrigation Association; Municipal District of Orange County, California; Center for Irrigation Technology; and Hunter Industries, Inc.

Brian Vinchesi, President, The Irrigation Association

The first presenter of the day was Brian Vinchesi, President of IA. Mr. Vinchesi outlined his presentation with three questions: What is irrigation efficiency? What causes low efficiencies in an irrigation system? What are the current and future irrigation technologies for improving water efficiencies and saving water?

Mr. Vinchesi defined irrigation efficiency as the amount of water stored in the soil available to the landscape divided by the amount of water used by the sprinklers. He explained that a well managed and maintained, properly designed and installed overhead irrigation system might have an efficiency rate as high as 80 percent, compared to a poorly designed and managed system that could be at 50 percent or lower. Efficiency can greatly affect water use, even when it varies only a small amount.

Mr. Vinchesi provided a few specific examples of irrigation efficiency. In one example, for a landscape that needs 0.10 inches of water, a 50 percent efficient irrigation system would need to apply 0.20 inches of water, while an 80 percent efficient system would only need to apply 0.125 inches. Furthermore, to apply 0.12 inches of water with a 35 foot square spacing and four 2.5 gallons per minute (gpm) sprinklers, a 60 percent efficient system would require 600 gpm, while a 75 percent efficient system would require only 480 gpm. This difference in efficiency results in a difference of a 60 versus 48 minute water time per cycle and 11,800 gallons over 90 days from just four sprinklers.

Mr. Vinchesi continued his presentation by discussing the causes of low efficiency in an irrigation system. Some of the causes include: bad design, equipment selection, poor installation, improper operation and management, and reduced maintenance. In relation to sprinklers, new nozzles, better uniformity/distribution, lower operating pressures, and pressure regulation are all ways to improve an irrigation system. Mr. Vinchesi stated that uniformity represents how evenly

the sprinkler applies water to the area being irrigated. He contends that uniformity has been successful with golf courses, but is just starting to improve in non-golf course areas.

Mr. Vinchesi stated that matched precipitated nozzles are one method of improving uniformity. Matched precipitated nozzles ensure that the sprinkler's water output is proportional to the area that the sprinkler covers. Failure to match precipitate with nozzles dramatically affects the system's uniformity. Although this is not a new technology, Mr. Vinchesi maintains that matched precipitation is getting easier to accomplish.

Mr. Vinchesi then spoke about low volume irrigation, rain shutoffs, moisture sensors, and Smart Water Application Technology (SWAT).

- There are three main types of low volume irrigation systems: drip hoses, soaker hoses, and micro spray. All of these systems are influenced by pressure regulation and maintenance requirements. Mr. Vinchesi maintains that many institutions, such as universities, do not use drip irrigation due to the amount of maintenance involved.
- There are two primary types of rain shutoffs: conventional hard wired and wireless, which have distance restrictions. Mr. Vinchesi stated that many states have passed or are considering mandatory rain shutoff (system interruption) legislation to improve the efficiency of irrigation systems.
- Mr. Vinchesi believes that moisture sensors are more accurate than rain shutoffs and are continually getting better. Although moisture sensors may be more viable, he maintains that they can be difficult to use due to calibration and winterization requirements. Currently, Mr. Vinchesi contends that moisture sensors are best used as a safety switch and not as an on/off switch.
- Mr. Vinchesi stated that SWAT is becoming more and more popular in irrigation systems. Evapotranspiration-based controllers and moisture sensor-based controls are a couple examples of the growing SWAT technology.

In conclusion, Mr. Vinchesi questioned whether these new and/or improved irrigation technologies can be labeled as improving water efficiencies and, therefore, reducing outdoor water use. To begin answering this question, he identified a number of potential hurdles facing the labeling initiative:

- Because irrigation is a system, will the end user understand that only specific components are reducing water use?
- Will labeling specific components of the system confuse or complicate the understanding of what is trying to be accomplished?

- Are there any real differences between a labeled and unlabeled component?

Finally, Mr. Vinchesi identified some of the activities that are currently being conducted in the irrigation sector that will benefit a labeling program:

- Manufacturers continue to improve the uniformity of sprinklers.
- New products are being developed to help reduce inefficiencies in irrigation systems (e.g., pressure-regulating sprinklers and evapotranspiration-based controllers).
- Certification and education programs continue to teach installers proper irrigation system installation procedures.

Joe Berg, Municipal District of Orange County, California

The second panelist was Joe Berg, Water Use Efficiency Program Manager with the Municipal District of Orange County, California (the District). Mr. Berg spoke about general residential water usage, a residential water use study, and the landscape water savings approach for Orange County. He contends that residential water usage generally breaks down with approximately 58 percent used for landscape, 11 percent for toilets, and the remainder for faucets, baths, dish washers, clothes washers, and showers. When examining the problem of water conservation and efficiency, the District opted to evaluate opportunities in residential water usage versus the examining landscape water usage. According to Mr. Berg, the District chose not to focus on landscape water usage because they were not confident in the reliability of the savings, the quantification of the savings, and the available landscape irrigation technology. The District decided rather to replace toilets, shower heads, clothes washers, and aerators because they were confident that customers did not have to change the way they used the fixtures to achieve the expected water savings.

In the mid 1990's, Mr. Berg maintains that the District realized that the next big opportunity in water savings was in irrigation, focusing on water pressure, design, and runoff. The District conducted a study looking at residential weather-based irrigation scheduling and the use of controllers in a residential setting. At the same time, the watershed issue was heating up which prompted a new study on residential runoff reduction. Results of the residential weather-based irrigation schedule study identified a water savings of 37 gallons per day (gpd) or 16 percent of landscape water use. Nearly all of the controller recipients (97 percent) noted no change or observed improvements to landscape appearance. Results of the residential runoff reduction study identified a water savings of 41 gpd in single-family homes, and 472 gpd in small commercial landscapes. There was 64 to 71 percent runoff flow reduction. In addition, a water quality analysis found no statistically detectable change in concentration. But a change was found in customer satisfaction with 75 percent of customers stating that they would recommend the weather-based irrigation, but 58 percent would not pay a monthly fee for evapotranspiration controllers.

In the last segment of his presentation, Mr. Berg spoke about the landscape water savings approach for Orange County. Mr. Berg used a landscape water savings pyramid to display this concept. The first pyramid illustrated existing development and increased irrigation efficiency. It displayed the importance of irrigation control/scheduling by placing it as the foundation of the pyramid, system efficiency and maintenance ranked in the middle, and climate appropriate plants were placed at the smaller, point of the pyramid. The second pyramid focused on new development, reduced runoff, and pollution. As opposed to the first pyramid, climate appropriate plants were placed as the foundation of the pyramid, system efficiency and maintenance remained in the middle, and irrigation control/scheduling held less importance so it was located at the top of the pyramid. Mr. Berg concluded that to achieve maximum water efficiency, the District should rely on educating the consumers and promoting smart irrigation controllers.

SWAT: Smart Water Application Technology

David F. Zoldoske, Director, Center of Irrigation Technology

The third presenter was David F. Zoldoske, Director of the Center of Irrigation Technology at California State University. Dr. Zoldoske focused his presentation on the development of SWAT including climate-based controllers and soil moisture sensors for turf and landscape irrigation.

Dr. Zoldoske's presentation focused on the four steps involved in developing SWAT:

- Step 1: Water purveyors identified a need. Dr. Zoldoske indicated that 20 to 30 percent of the water applied to urban landscape is wasted in the form of "over-irrigation" (runoff and deep percolation).
- Step 2: IA solicited stakeholder input by conducting industry meetings in New Orleans, Louisiana and Fresno, California.
- Step 3: IA developed a draft controller standard and a draft soil moisture standard which are both available on the their Web site at <www.irrigation.org>. Dr. Zoldoske stated that protocols have been developed for both the climate-based controllers and soil moisture sensor testing.
- Step 4: Movement toward developing national technology standards.

Next, Dr. Zoldoske presented an overview of the Center for Irrigation Technology. The Center is a nationally and internationally recognized irrigation testing facility with over 20 years of experience. The center conducts hydraulic laboratory testing, equipment testing, and field research on irrigation equipment.

Dr. Zoldoske maintains that the keys to SWAT's success lie in the irrigation equipment/systems. The irrigation equipment/systems must be sold by promoting their benefits to the water, energy, and environmental matrix. Those benefits are maximize water efficiency,

minimize energy use, and reduce environmental impact. Dr. Zoldoske maintains that we have the technology to maximize water efficiency in irrigation, it is just a matter of organizing it in a smart, productive way that is user friendly.

Today's Water Saving Passive Products
Kevin Gordon, Hunter Industries, Inc.

Kevin Gordon, Senior Product Manager with Hunter Industries, was the fourth and final presenter of the first panel of speakers. Mr. Gordon's presentation focused on water management and weather-responsive evapotranspiration systems.

Mr. Gordon stated that computer-based evapotranspiration systems could provide affordable central control of irrigation systems for football fields, office parks, universities, and government buildings. He also encouraged the use of sensors and stated that they are not being used enough to promote water efficiency. Specifically, Mr. Gordon believes that excessive flow sensor products and rain shutoff products should be more widely used. The excessive flow sensor products lower the pressure of water if a nozzle comes off of a sprinkler, preventing a geyser of water from flowing into the air. Although, rain shutoff devices are available in many stores, available in wireless form, and are inexpensive, Mr. Gordon maintains they are hardly ever used.

Mr. Gordon believes that nozzle efficiency is one of the easiest ways to achieve higher efficiency rates. Factory installed check valves can also contribute to greater efficiency by controlling/eliminating low head drainage and preventing runoff from landscapes. Pressure regulation is another form of water efficiency that can be utilized in irrigation systems. Non-pressure regulated sprinklers mist/fog water onto a landscape and are inefficient because a significant portion of the water evaporates into the air. Pressure-regulated sprinklers, however, emit a more direct spray of water which results in less water evaporating and more water making it to the landscape. Mr. Gordon also explained that regulators act as a flow control device if a nozzle is removed. This controls the flow loss and eliminates potential damage to surrounding structures. Mr. Gordon concluded by stating that today's modern products can save water.

4. FACILITATED DISCUSSION: WHAT PRODUCT CATEGORIES OFFER WATER EFFICIENCY OPPORTUNITIES AND IN WHAT STAGE OF DEVELOPMENT ARE THEY?

The first panel of presentations was followed by a facilitated discussion. Fellow panelists and audience members were free to ask questions as well as comment on remarks given by the first set of panelists.

Dr. Zoldoske commented that additional product and technological development is needed for water efficiency.

Mr. Berg commented that many people over-water their lawn in an effort to achieve a desired look. Efficient irrigation needs to be encouraged to help stop this action.

Mr. Gordon stated that research and uniformity upgrades are needed in the further development of water-efficient products. He also stated that price is a primary driver in whether or not a customer will purchase a product, and success can be achieved by giving the educated contractor labeled products. Mr. Gordon also encouraged consumers to accept and try water-efficient products.

George Alexanian, President of Alex-Tronix, stated that reasonable goals need to be set to achieve water conservation. To help achieve these goals, Mr. Alexanian believes that water-efficient products need to be labeled.

Adam Skolnik, President of Senninger Irrigation, commented that today's technology is not being applied. He believes that the technology needs to be more affordable to encourage consumers to buy and use these products and incorporate them into their lives. Therefore, Mr. Skolnik recommended that national-level funding and resources be used to encourage homeowners to use the products.

Brent Mecham, Landscape Water Management and Conservation Specialist for Northern Colorado Water Conservancy District, questioned whether the 20 to 30 percent efficiency savings identified in Dr. Zoldoske's presentation is based on a perfect system or a realistic system. Dr. Zoldoske stated that the Center for Irrigation was not trying to develop a perfect system, so the numbers in the presentation are for a realistic system. Mr. Berg noted that in San Diego, encouraging water-efficient landscaping resulted in improved efficiency percentages. Anna Thurston, Water Conservation Specialist for the City of Tacoma, also commented that system inefficiencies and non-perfect systems make it difficult to market water-efficient irrigation systems. Furthermore, based on years of water audit data, Ms. Thurston believes that improved irrigation can be achieved with a combination of water scheduling and proper water-efficient landscaping.

Donna DiFrancesco, Water Conservation Specialist, City of Mesa, Arizona, asked Mr. Berg to repeat some of the numbers he stated in his presentation. She commented that it may not be possible to easily install smart controllers into existing systems. Ms. DiFrancesco then asked if adjustments are made to the systems and how are these systems set up. Mr. Berg explained that scheduling technology was used with a weather signal and programmed with hydroplane irrigating. Mr. Berg also commented that he would like to see further studies performed for better technological development in the field of smart controllers.

J.T. Hiatt, Executive Vice President of Sales with H2O Strategies, Inc., commented that since the cost of water is not very high, there is no incentive for people to conserve. Mr. Berg responded that California has pending legislation to meter every house. Hopefully, this will help people realize how much water they are actually consuming.

Phil Regli, Consultant for Environmental Conservation Concepts, expressed his concern for the high runoff in California and commented that the runoff should be measured.

Bob Galver, City of Santa Monica, commented that spray heads are part of our future in this business. He does not believe, however, that the spray heads currently on market shelves would measure up to a Water Star standard. Mr. Galver indicated that he would like to see a program that recognizes spray heads in their own class.

Phyllis Rowe, President of Arizona Consumer Foundation, commented that her organization is currently involved in ENERGY STAR and indicated that they are very interested in becoming involved with Water Star.

Mr. Regli commented that roads in development areas should be resurfaced three years early because excess irrigation causes runoff erosion. Mr. Berg responded that controlling runoff can add an additional two to three years of life to pavement. Controlling runoff will also address safety concerns that arise when people slip on the eroded pavement and then file lawsuits against the city.

Ms. Thurston questioned how a service fee for evapotranspiration controllers would be charged to the consumer. Would it be through a contract, prepayment, or some other mechanism? Ms. Thurston indicated that the program needs to be as inclusive as possible, but also fiscally responsible. Robert Reaves, Sales Representative for HydroPoint Data Systems Inc., responded that his customers are given a two-year pre-broadcast service and billed for an entire year at one time.

Tony Gregg, Water Conservation Manager for the City of Austin, commented that another option might be to work with energy companies to set up weather systems enabled to send signals to radio receivers that control irrigation systems. Andrew Davis, Program Manager for the Arizona Municipal Water Users Association, responded that setting up radio receivers as controllers is a possibility. Mr. Davis maintains that it is difficult to get an agency set up to

control such an evapotranspiration system, but believes a weather system connected to a radio network would work, if there are not too many hydropoints.

Keith O'Neill, Director of Business Development for Rain Master Irrigation Systems, noted that a historical and manual evapotranspiration component has been built into their system so that they can be put to use for the consumer. His organization is using the Internet to educate the consumers. Mr. O'Neill believes that water-efficient landscape management is a huge change that will not happen overnight and recommends using a migrational step process to implement the program.

David Gordan, Product Manager for Aqua Conserve Systems, Inc., commented that there should be a "no fee system" for smart controllers.

Mr. Reaves, commented that water fees do not feed historical evapotranspiration data. He maintains that E data service is everywhere including MM5 modeling software. He believes an evapotranspiration network must be calculated and we should not rely on only one network.

Robert Conn, Wala Wala Sprinkler Company, stated that passive technology possesses the best possible impact for water efficiency.

Mr. Alexanian commented that all methods for efficient irrigating are valid. He emphasized that there must be an incentive for consumers to purchase water-efficient products. Mr. Alexanian also believes that the products must also be practical and user friendly, if not, they are worthless.

Karen Guz, Conservation Planner for the Conservation Department of San Antonio Water System, commented that the San Antonio Water System has worked with Texas A&M University for the past 7 years to implement an evapotranspiration-based lawn advice program. Currently, there are a few thousand people receiving free lawn advice through e-mail or phone messages. Customers must sign up and ask to receive this advice. Ms. Guz believes that the biggest barrier to implementing this program is getting the customers to measure their precipitation rate so that they can follow the advice that they are given. Another barrier is getting customers to change their irrigation system settings. Ms. Guz stated that she would be intrigued to see development toward more user friendly irrigation systems. In addition, Ms. Guz indicated that her organization would like to see some schedules that would be generated by evapotranspiration controllers. Mr. Sheehan, President of Confidence Landscaping, Inc. and the California Landscape Contractors Association, responded that a weather track product that asks the consumer questions about their landscape could help calculate proper settings for irrigation systems. In turn, the irrigation system sets a watering schedule for each station.

Mike McClung, Application Scientist with Dynamax Inc., stated that TH20 devices can be installed in just about any irrigation system. When soil moisture levels goes below a specified level, the device signals the irrigation system to turn on and dispense the proper amount of irrigation.

Jeff Lee, Water Management Technician with the City of Mesa, Arizona, commented that the acceleration of products is a good idea, but they are just a tool. Evapotranspiration-paging controllers are not the only answer, there are many options for consumers and the market should determine which device will be the best for the consumer. He believes the water efficiency community wants assurance from EPA that the Water Star program will follow proper testing protocols.

Peter Mayer, Vice President, Aquacraft, Inc., suggested labeling plant materials for water- efficient landscaping.

5. PANEL DISCUSSION: CAN IRRIGATION SYSTEMS BE LABELED?

The second panel discussion of the day focused on the question “Can irrigation systems be labeled?” The panel consisted of three presenters representing The Toro Company, Eugene Water and Electric Board, and Ewing Irrigation.

Water-efficient Irrigation Systems Claude Corcos, The Toro Company

The first presenter of the second panel was Claude Corcos, a Certified Irrigation Designer representing The Toro Company. Mr. Corcos’s presentation focused on irrigation system efficiency and how both uniformity and efficiency can affect performance. Mr. Corcos described “uniformity” as how evenly the water is applied to a landscape and “efficiency” as how much of the applied water is wasted beyond the needs of the plant or soil. He also stated that high uniformity is a prerequisite to high efficiency.

Mr. Corcos believes that system composition is an important aspect for achieving high uniformity and efficiency in irrigation systems. Initial design, irrigation hardware (i.e., sprinklers and nozzles, valves and controllers, drip components), and installation and maintenance (i.e., initial installation, repairs, adjustments) all play key roles in system composition with respect to achieving high uniformity. According to Mr. Corcos, scheduling is the most important component of system composition for achieving high efficiency.

Mr. Corcos explained the many aspects are needed to achieve uniformity. He stated that operators must understand and follow good design practices, understand flow rates and operating pressures, match the sprinkler type to the site conditions, use valves and controllers that allow for precise control (automation), allow zones to be separated for different climatic zones, ensure the system is installed according to its initial design, and maintain uniformity after system repairs. He also mentioned that uniformity can be achieved through the use of water-efficient components such as drip irrigation, which can localize the application of water.

Furthermore, Mr. Corcos explained that—assuming a uniform system has been designed, installed, and will be maintained— proper scheduling is critical to achieve high system

efficiency. Contemporary strategies to improve efficiency include: operator education, rain shutoff devices, and soil moisture sensors. Mr. Corcos identified three emerging technologies that increase efficiency: evapotranspiration-based controllers, central controls, and technologies borrowed from other industries.

In closing, Mr. Corcos emphasized that management is the key to a successful water-efficient irrigation system. Uniform application of water is possible today using existing products. Although he maintains that the quality of installation is difficult to control, Mr. Corcos believes it is critical. Mr. Corcos also believes that scheduling water application to meet the demands of a particular landscape is the next frontier for the industry.

Warren Gorowitz, Ewing Irrigation

The second presenter was Warren Gorowitz, National Water Management Products Sales Manager with Ewing Irrigation. Mr. Gorowitz's presentation focused on getting people to care about water-efficient products and understanding the design, installation, and maintenance of irrigation systems.

Mr. Gorowitz presented the audience with the question "Will people care about purchasing water-efficient products?" Mr. Gorowitz maintains that the public does not believe that they waste water and they do not realize that water is a finite resource. He then questioned whether people are paying what water is really worth. He contends that the public needs to understand the benefits of using water-efficient products. To achieve this level of understanding, Mr. Gorowitz believes that a focused marketing plan is crucial and that financial incentives like ENERGY STAR rebates need to be offered.

Mr. Gorowitz described the makeup of an irrigation system as a multiple component system including: site conditions that affect pressure and flow, pipe sizing and layout, irrigation devices (e.g., spray heads, rotors, bubblers, drip emitters), controllers (e.g., time clock), system design, installation, maintenance, and water management. Mr. Gorowitz believes that irrigation systems should be designed by an irrigation professional. This presents the opportunity to work with trade association programs such as IA's Certification Program (CID, CLIA) and the American Society of Irrigation Consultants (ASIC). He also believes that proper installation practices will help the irrigation system maintain its designed efficiency. Installation also presents opportunities for education and training which can be achieved through programs such as the Contractor Association Certification Programs (CLT, ALCA, CLCA), and equipment manufacturer training at the distributors. Once installed, Mr. Gorowitz maintains that irrigation systems must be properly maintained to achieve its expected efficiency. He recommends monthly system checks to identify and repair broken components such as damaged sprinklers and clogged nozzles.

Mr. Gorowitz maintains that proper water management is the key to an irrigation system's efficiency. Proper management includes frequent site visits to evaluate the system and adjustment of irrigation schedules as needed by site and plant conditions to improve plant life

and quality and avoid unnecessary runoff. Mr. Gorowitz believes that new technology will make water management easier, but criteria for evaluating the different technologies will need to be developed. He contends this can be achieved through the use of “smart” controllers with moisture- and weather-based controls, flow meters, rain sensors, pressure-regulating sprinkler heads, low gallonage nozzles, and high uniformity rotors. Mr. Gorowitz believes that proper water management will make the customer happy.

Being a distributor, Mr. Gorowitz believes that there are several opportunities for distributors in the field of water-efficient products. He maintains that irrigation distributors do not simply sell the products, they interact daily with the professionals in the industry, working together to build relationships. Distributors work with and build these relationships with landscape contractors, landscape architects, irrigation consultants, water agencies, industry trade associations, and equipment manufacturers. Mr. Gorowitz commented that they can help facilitate the training for technical/troubleshooting classes, point of purchase displays, and trade shows. In conclusion, he believes that if the green industry works together they can make the water-efficient product labeling program a reality.

Jill Hoyenga, Eugene Water and Electric Board

Jill Hoyenga, Water Management Specialist with the Eugene Water and Electric Board, gave the third and final presentation of the second panel. Ms. Hoyenga expressed her desire to see water-efficient products labeled on the market, identified several advantages to labeled water-efficient products, described some implementation considerations, and spoke of IA’s SWAT Committee.

Overall, Ms. Hoyenga believes that efficient irrigation products are needed because irrigated landscapes enhance the quality of life in urban areas, residential irrigation loads create a huge seasonal peak demand, and efficient irrigation optimizes the infrastructure. Furthermore, Ms. Hoyenga maintains that if irrigation is left out of the labeling effort, we will lack an important education tool.

Ms. Hoyenga maintains that irrigation components can be labeled. However, she cautioned that even the best irrigation components can be used in an inefficient design and even the best components and best design can become inefficient over time due to lack of maintenance. On the other hand, Ms. Hoyenga also stated that one cannot design or build a system better than its component parts, nor can one manage and operate a system better than the limitations of its components and design. Therefore, Ms. Hoyenga believes that customers need clear directions, such as labeling, to help select efficient products.

Ms. Hoyenga described IA’s SWAT Committee as being made up of irrigation manufacturers, distributors, contractors, and water purveyors with two subcommittees: technical specifications and market transformation. The committee is currently focused on a narrow scope, being residential and light commercial climate-based controllers and moisture-based soil sensors. Ms. Hoyenga maintains that conservation testing conducted by the Committee provides

standards for the many existing efficiency products. She also maintains that their Market Transformation Plan consists of a nationwide public education effort to inform consumers about water-efficient irrigation products. Ms. Hoyenga believes that EPA's labeling program can support point of purchase consumer education.

Ms. Hoyenga suggested that when developing an irrigation labeling system, EPA acknowledge that hardware selection is key for automated climate and moisture-based scheduling tools and consider requiring an audit with the hardware design and installation. She recommends that the audit have an expiration date to encourage maintenance.

6. KEYNOTE ADDRESS

Ben Grumbles, EPA's Acting Assistant Administrator for the Office of Water, presented the keynote address at the meeting and welcomed the opportunity to speak about EPA's budding Water Star program for water-efficient product labeling. Mr. Grumbles discussed the importance of this labeling program, other water-efficiency activities, and water-efficient urban landscape irrigation.

Mr. Grumbles maintains that this program is a priority of this Administration and will continue to be a high priority for him. He also commented that EPA Administrator Leavitt is also very enthusiastic about this program. Evidence of Administrator Levitt's support is the inclusion of \$800,000 for the water-efficient labeling program in President Bush's 2005 budget for EPA. The Departments of Interior and Energy are currently involved with water efficiency and water supply issue projects and Mr. Grumbles believes that EPA's Water Star program will complement them while fully respecting state water rights.

Mr. Grumbles stated that the two major goals of the water-efficient product labeling program are to reduce or defer water and wastewater infrastructure costs and to conserve water supplies. EPA is putting emphasis on the four pillars of sustainable infrastructure: water efficiency including Water Star, better management, full-cost pricing, and the watershed approach. Mr. Grumbles invited the audience to visit the Office of Water's new Sustainable Water Infrastructure for the 21st Century Web site at <http://www.epa.gov/ow/infrastructure/index.htm> for more information about these approaches.

Mr. Grumbles contends that if more utilities adopt the principles of sustainable infrastructure, future needs for infrastructure could be significantly reduced or deferred. From EPA's vantage point, Mr. Grumbles believes that the rate of occurrence of water shortages, water scarcities, and conflicts over water supplies is increasing. For the United States to sustain its water supplies in the face of increasing population and economic growth, we must be increasingly smarter about how we use water. In addition, he contends that Water Star will also help maintain water levels in streams, rivers, lakes, and estuaries, which helps protect aquatic habitats. The program will also help prevent water pollution and reduce energy use. Mr.

Grumbles believes that water-efficient landscape irrigation products might have significant storm water management and water pollution prevention aspects. Taken together, Mr. Grumbles believes that Water Star has an impressive benefits package to offer.

With respect to landscape irrigation systems, Mr. Grumbles believes that IA's acronym for their smart water application technologies, SWAT, is a very aggressive-sounding acronym and a fitting one to use for attacking such a formidable problem. He maintains that IA deserves a lot of credit for helping move the industry toward more water-efficient technologies and practices and indicated that EPA is very excited about these new products and their market possibilities. Mr. Grumbles acknowledged that there will be challenges because these products work as part of a system and their performance depends on other components, as well as proper system design, installation, and management.

Mr. Grumbles stated that EPA's interest in urban landscape irrigation is based on the amount of water it uses in both residential and non-residential settings, the seasonal and climatic nature of irrigation, and the potential for reducing excessive irrigation. He noted that the amount of residential outdoor water use is estimated to average about 32 gallons per person per day, and about 80 to 90 percent of that is for landscape watering. Mr. Grumbles also noted that 80 percent of the households in the country have a private lawn, totaling approximately 18 million acres and that an average of 8 billion gpd of publicly supplied water is applied to residential landscapes.

While those average numbers are impressive, Mr. Grumbles contends that the seasonal and climate aspects of landscape irrigation are also important. In some cities, summertime irrigation water use can be 1.5 to three times more than normal winter-water use, thus creating the water system's peak demand. Cities in hot, dry climates may experience even higher peaks. Peak water demand greatly influences water infrastructure sizing and costs. Mr. Grumbles indicated that tests have shown that SWAT may reduce seasonal landscape water use by as much as of 40 gpd per home. Efficient irrigation, therefore, can have a significant effect on reducing or deferring water infrastructure costs, not to mention the benefits to aquatic life.

Mr. Grumbles maintains that another very exciting potential benefit of efficient landscape irrigation is reduced runoff. Preliminary tests have shown reductions of 45 percent in runoff from irrigated residential landscapes using SWAT. If further testing confirms those results, Mr. Grumbles contends the benefits from that level of runoff reduction would be very significant in preventing pollution from fertilizers, pesticides, and herbicides and for reducing storm water infrastructure costs.

In conclusion, Mr. Grumbles noted that EPA sees great potential for water-efficient landscape irrigation products and systems to help achieve the goals of Water Star: infrastructure cost reduction, water supply conservation, and water quality benefits. That's a win-win worth working toward. Mr. Grumbles thanked the audience for their participation in this meeting and ensured them that EPA intends to continue to work with everyone to further our mutual goal of water-efficient landscape irrigation.

7. FACILITATED DISCUSSION: WHAT ARE THE TECHNOLOGY ISSUES WITH RESPECT TO A WATER-EFFICIENT IRRIGATION SYSTEM? CAN SYSTEM WATER EFFICIENCY BE TESTED AND VERIFIED?

The second panel of presentations was followed by a facilitated discussion. Fellow panelists and audience members were free to ask questions as well as comment on remarks given by the second set of panelists.

George Alexanian asked the second panel what percentage of people, outside of agriculture, use evapotranspiration and/or ground moisture sensing methods? Mr. Corcos responded that evapotranspiration can be the base for efficient irrigation, but currently it is used by less than one percent of non-agriculture people. Ms. Hoyenga responded by reemphasizing her previous statement that consumers need to be educated on purchasing and maintaining quality systems. She indicated that there should be a decrease in the learning curve process for consumers.

Bob Galbreath, Water Resources Specialist with the City of Santa Monica, asked what is going to get a contractor to buy a labeled product? He maintains that consumers need to be educated in order to see the product's value and that the label will help consumers identify a quality product, that they are educated about.

Phyllis Rowe commented that consumers need to be convinced that even though many of these water-efficient products cost more money, it is money well spent.

Gary Gelinas, President of Water2Save, suggested that the price of water is too low and that the price should be raised for consumers to encourage the use of water-efficient products. Ms. Hoyenga responded that raising the price of water is a difficult task. She believes that council board members, the ones that control the local price of water, could be kicked out of office if they increased the price of water. Furthermore, Ms. Hoyenga maintains that raising water prices may make it difficult for low income consumers to pay for their water.

J.T. Hiatt asked what is being done to work with developers to have them install efficient irrigation systems. Mr. Gorowitz responded that CLCA, being one piece of the puzzle, is working to educate the consumers and developers on the benefits of efficient irrigation systems. Ms. Hoyenga added that there is a lot of information on how to build and use efficient irrigation systems. Mr. Berg noted, from a CLCA standpoint, that there is a lot being done right now with irrigation consultants to establish a larger number of water-efficient irrigation systems.

Robert Reaves emphasized you must take it one step at a time when dealing with contractors.

Tony Gregg noted that those who do not have automatic irrigation systems might use less water. He believes that consumers with automatic irrigation systems tend to have lots of money, thus they may not care if the cost of water rises.

8. PANEL DISCUSSION: CAN DESIGN, INSTALLATION, AND OPERATION BE CERTIFIED TO ACHIEVE WATER-EFFICIENT IRRIGATION?

The third and final panel discussion of the day focused on the question, “Can design, installation, and operation be certified to achieve water-efficient irrigation?” The panel consisted of three presenters representing Water Management Services, Inc., the California Landscape Contractors Association, and Arizona State University.

Lorne Haveruk, Water Management Services, Inc.

Lorne Haveruk, founder of Water Management Services, Inc., began his presentation by stating as most water efficiency experts agree, it is not the choice of plants alone which reduces landscape water use. He maintains that reductions also occur from designing efficient water systems which are installed by certified or licensed installers that install as per specifications and are operated by trained staff that make scheduling and other operational decisions from a high proficiency level. Mr. Haveruk believes that certified water-efficient irrigation would help inform consumers of the product and work performed, along with providing a level of assurance and guarantee for them. A certificate for meeting a standard could be issued for a product or work performed. He noted that a license to perform the work (i.e., properly installing irrigation systems), would likely be issued to a qualified installer.

Mr. Haveruk contends that efficient irrigation means being productive without waste. Efficient irrigation would include efficient and effective operation as measured by a comparison of production with cost (as in water, energy, time, and money). He maintains that efficient irrigation and certification would improve the ratio of the useful energy (water) delivered by a dynamic system to the energy supplied to it.

Speaking specifically on the topic of design, Mr. Haveruk quoted Jim McCabe of Sensible Technologies:

“Since the operation of the irrigation system encompasses any prior design and installation, then water use efficiency can be calculated based on the actual amount of irrigation water used (as can be read from the meter for some prior period of time, say a month) and the expected (calculated) net plant water requirement (as can be determined from grass reference, evapotranspiration data, the landscape coefficient, and rainfall for the same prior period of time).”

Mr. Haveruk, also stated that alternatively, design, installation, and operation can each be separately certified based on water-use efficiency standards (or goals). He contends that design

distribution uniformity can be calculated from head profile data and head layout and that from this, one can calculate water use efficiency as a run time multiplier.

When evaluating an irrigation system Mr. Haveruk maintains there are two factors that must be considered. The system must be able to supply the plants' needs (adequacy) and be able to do this with an economically acceptable efficiency. An approach suggested by Mr. Haveruk is to answer the adequacy question, then determine the probable resulting efficiency.

Mr. Haveruk believes that installation can be certified to achieve water-efficient irrigation. Again quoting Mr. McCabe, Mr. Haveruk stated that "distribution uniformity can be measured with catch cans, resulting also in a calculation of irrigation system efficiency as a run time multiplier." Mr. Haveruk then proposed the following set of certification installation guidelines:

- Install irrigation as shown in the plans and as outlined in the specifications. Plans must be accurate and specs must be site specific.
- Install irrigation-only meters (deduct meters).
- Install rain shutoff devices.
- Require check valves to prevent low head drain.
- Use drip or other low volume irrigation systems where applicable.
- Submit installed irrigation system to an irrigation audit. System should meet a minimum average distribution uniformity of 0.625.

Mr. Haveruk also believes that operations can be certified to achieve water-efficient irrigation. Quoting Mr. McCabe again, Mr. Haveruk believes that "the actual schedule operation can be checked by evaluating actual water usage over a period of time compared to a calculated (after the fact) water usage based on actual reference evapotranspiration and rainfall data that had occurred for the same period of time." Mr. Haveruk then proposed the following certification operating guidelines.

- Keep on file specifications for all irrigation system components originally proposed and use the same when making repairs or replacing parts.
- Monitor landscape water use for each site to ensure supplemental watering remains within budget during the plant's establishment period.
- Adjust controllers as often as possible to match weather conditions.
- Use soil sensors where applicable.

- Scheduled a walk through of the irrigation system during spring start-up and throughout the irrigation season.
- Audit the system annually to allow accurate scheduling of the system, allowing the auditor to identify problems that could affect system efficiency.

In conclusion, Mr. Haveruk made the following recommendations for achieving water-efficient irrigation systems:

- The system must be designed by a certified or licensed designer.
- The computer design should be tested for efficiency prior to installation, ensuring minimum operational requirements (DU 0.625 or higher) will be met.
- The certified irrigation assessment/audit should be conducted by a certified auditor after installation, ensuring an operating minimum of no less than DU 0.625 has been achieved.
- The irrigation system audits are to be conducted every year to ensure the system continues to operate at or above the minimum standards.
- Regularly scheduled irrigation system inspections need to occur throughout the irrigation period (either on a monthly or more frequent basis) by a certified irrigation technician (CIT or CIC).
- Ongoing annual training of operational personnel must coincide with the rapid technological advances occurring within the irrigation industry.
- Evapotranspiration weather-based irrigation schedule change technology is now available and needs to be adapted and recognized similar to ENERGY STAR's energy-efficient products.
- To be efficient means to be current. To be current, irrigation education opportunities must be readily available, at least annually and on a local basis. There is a great need for training those in the field that work with the product if water efficiency is to be realized, if not, certification will not be feasible.

Jeff Sheehan, California Landscape Contractors Association

Jeff Sheehan, President of the California Landscape Contractors Association, was the next presenter of the day. Mr. Sheehan stated that his association can certify designers, operators, and installers of water-efficient irrigation systems and that he has been designing

systems and landscapes for the last 25 years and water conservation landscapes for the last 15 years.

Mr. Sheehan asked the audience “Why become certified?” The process of becoming certified, is a lot of work. After a long day of work, the contractor has to attend classes, purchase books and other supplies for the classes, etc. Although, contractors, maintenance workers, and management know that becoming certified is a good thing, Mr. Sheehan believes it is difficult to get them to commit to the certification process. Architects and designers are very educated in their field and tend to not have problems with regulations and seek advantages and ways to improve themselves. Contractors, however, tend to fall into an education level right below architects and designers, but tend to be wary of regulations. When considering certification, Mr. Sheehan maintains that operation and maintenance workers want to know what is in it for them, why become certified?

From a design standpoint, if a whole system has a good design, but does not receive the same kind of attention on the installation and maintenance end, Mr. Sheehan believes that you get a great design, but a system that does not work. To develop a working system, he made the following recommendations:

- Price water in such a way to encourage conservation. Mr. Sheehan contends that there are methods for establishing a base rate that involve measuring the square footage for particular plots.
- Establish rebate programs.
- Require that the consumer have their irrigation system installed and maintained by a certified contractor to become eligible for the rebate.
- Conduct system audits to make sure it was properly installed.

In conclusion, Mr. Sheehan maintained that we need a system that requires the end user to seek out the designers, contractors, and maintenance workers. The system also needs to save money on water costs for the end user and provide financial incentives for the designers, contractors, and maintenance workers to become certified. Therefore, Mr. Sheehan contends that raising water rates and creating a rebate program will help design a system that works for both the end user and the contractors.

Water-efficient Branding & Conservation **Jan Bush, Arizona State University**

Jan Bush, a graduate student at the Arizona State University School of Planning and Landscape Architecture, gave the final presentation of the day. Ms. Bush spoke about the overall

concept of a labeling program, the marginal costs and benefits for the consumer, and suggested a strategy for labeling and branding water-efficient products and services.

Conceptually, Ms. Bush believes that a branding program should establish the following claim with consumers: the costs associated with water, plumbing, design, and operation for water-efficient technologies should be similar to the same costs associated with existing technologies. She believes that an incremental increase in costs of water-efficient technology products and services created by product development and training for personnel is one cost to the consumer. Secondly, she discussed opportunity costs and asked what alternate purchase did consumers forego to buy water-efficient technologies products and services? Ms. Bush contends that conservation needs to make financial sense, if not, consumers will not care about it. Furthermore, she maintains that many economists believe that water efficiency and conservation is more in the public's interest, versus private interest. However, Ms. Bush believes that it is in private interests to conserve money and that EPA's program can assist with this.

Ms. Bush discussed two main benefits to consumers for purchasing water-efficient products. First, she contends that an incremental increase in savings avoids additional cost of infrastructure, pollution control, treatment, and drought management. Secondly, Ms. Bush maintains that an incremental decrease in anomie (Greek for lawlessness, refers to the condition of society or individual in which normative standards or conduct and belief are weak or missing) avoids anxiety and isolation by using the recognized standard of conduct. Ms. Bush believes a potential additional marginal benefit is an incremental increase in human conservation efforts. Consumers buy products and services and contribute to the protection of the ecosystem processes and interactions that produce the water. Ms. Bush proposed the following two reasons for including this marginal benefit:

- People do not produce water; natural systems do. When natural systems lose their functions, they produce less water, poor water, or no water. Ecosystem protection is a good reason to produce, sell, buy, and use water-efficient irrigation products.
- Local economies depend on healthy, water-based ecosystems. Every major industry depends on quality of life to attract and retain qualified employees, especially tourism in Arizona and the Southwest.

Ms. Bush believes that consumers recognize that the economy is dependent on the environment. There are visible linkages like tourism and jobs in the extractive industries, as well as critical, but less visible linkages to environmental services like drainage, flood control, and clean air. Ms. Bush mentioned that in correlation with the economic impacts of environmental tourism and jobs, the environment is at risk. With a larger percentage of wildlife dependant on water for livelihood, one must understand the importance of protecting our water resources.

Taking all discussion points into consideration, Ms. Bush suggested a strategy to strengthen the connection between a program to brand water-efficient products and services and conserve local water resources. Specifically, she recommends that EPA work with local

nonprofit professionals or water resource groups to learn about the resources and design and deliver a training module in the certification program for designers, installers, and operators. In addition, she recommends that the program donate a portion of receipts from the sale of branded products and services to water resource conservation projects.

In conclusion, Ms. Bush restated the need to look at the big picture. She maintains that the program should include strengthening consumers' connection of their purchase of branded products and services with conservation of the local water resources.

9. FACILITATED DISCUSSION: TO WHAT EXTENT CAN DESIGN, INSTALLATION, AND OPERATION BE CERTIFIED TO ACHIEVE WATER-EFFICIENT IRRIGATION? WHAT ARE POSSIBLE ROLES FOR AN EPA VOLUNTARY PROGRAM TO PROMOTE WATER-EFFICIENT LANDSCAPE IRRIGATION?

The final segment of the meeting consisted of soliciting input from meeting participants on two questions pertaining to the labeling of water-efficient irrigation systems: To what extent can design, installation, and operation be certified to achieve water-efficient irrigation? What are possible roles for an EPA voluntary program to promote water-efficient landscape irrigation?

Tony Gregg questioned who should be held accountable for water bills that become excessive, due to poorly installed irrigation systems? Mr. Gregg suggested that the irrigation contractors be held responsible. Mr. Sheehan responded that there are some enterprising groups in California that are trying that, and they have seen some success with signs of improved efficiencies and uniformities. Mr. Haveruk responded that irrigation contractors can also be held responsible.

Karen Warner, Water Conservation Specialist with the City of Scottsdale, believes that consumer water prices are too inexpensive and that certification is needed.

Vickie Driver, Water Resources Specialist with the San Diego County Water Authority, recommended that landscapers educate consumers on water-efficient landscaping and that consumers show their appreciation for landscapers. Mr. Haveruk reminded the participants that we are not trying to save just water, but also plants and property.

Mr. Gregg believes that contractors should educate customers and explain how much water they are using, what the water usage is doing to their landscape, and how they, as a consumer, can improve their water efficiency and thus their landscape. Mr. Sheehan responded that it does not make financial sense to do what Mr. Gregg is suggesting. Mr. Sheehan believes that this is where EPA can step in and assist with the costs associated with educating the consumer, otherwise he believes that contractors would have to increase their fees. Mr. Haveruk

believes that education fees could be included on the customer's contract or included as an optional charge.

Gary Gelinas, President of Water2Save, questioned who will monitor the performance of the irrigation systems, especially all the inefficient systems that are already in the ground and who will pay the rebate money, the federal government or water utility companies? Ms. Hoyenga responded that most water purveyors are required to have an integrated water management/ water resource plan. They are either required by the state have it in the capacity that is favorable to water conservation or they will not be able to have the water rights they already own. Jim Hanlon responded that EPA is investing several million dollars to examine water infrastructure needs across the country over the next year. EPA will not be only looking at the supply side, but also how to help manage the demand. However, Mr. Hanlon does not expect there to be any federal assistance for consumers in the foreseeable future. John Flowers, Water Efficiency Program Manager in EPA's Office of Wastewater Management, commented that state revolving funds, for both clean water and drinking water, have eligibility for incentive programs which could include rebate programs for water-efficient products. However, Mr. Flowers indicated that the states would have to agree to use those funds for such programs.

Lou Bendon, Vice President of PMSI, commented that there are financial benefits for the manufacturers, retailers, contractors, and especially for the consumers of water-efficient products. Mr. Bendon believes that reducing water usage by 15 to 30 percent will definitely bring about financial benefit to the consumer and that it is worth being certified and supporting these programs. Mr. Bendon also commended EPA for bringing together so many representatives from the water community to the meeting.

10. WRAP UP AND NEXT STEPS

Jim Hanlon thanked the audience for coming to the meeting and commented that their participation exceeded his expectations. He believes that the stakeholders learned a great deal about the issues the industry is dealing with in terms of products, systems, incentives, and pricing structures. On the benefits side, Mr. Hanlon maintains there is much to be gained, including infrastructure cost, conserving water resources, and preventing runoff. He stated that EPA looks forward to building on what it has learned from the stakeholder meetings so far.

Mr. Hanlon mentioned that the final scheduled stakeholder meeting will focus on residential, commercial, and institutional products. The meeting will be held in Seattle, Washington on April 13 and 14, 2004. Mr. Hanlon encouraged the stakeholders to continue to participate in the meetings to build upon the progress that has been made. Mr. Hanlon also encouraged the participants to visit <<http://www.epa.gov/owm/water-efficiency/index.htm>> to view the latest highlights of EPA's water-efficiency program.